

## VERIFICATIONS.

The *Probabilities*, as worked up three times daily and issued to the public, have been carefully compared with the actual conditions following. The percentage of verifications has averaged 83.9 for New England; 88.7 for the Middle States; 90.1 for South Atlantic States; 92.0 for Eastern Gulf States; 89.4 for Western Gulf States; 88.3 for Tennessee, Ohio valley and Lower Lake region; 87.6 for Upper Lake region; 90.1 for Upper Mississippi valley; 87.9 for lower Missouri valley. The average for the whole country is 89.0 per cent. For the weather, 92.3; wind direction, 90.3; temperature, 88.6; barometric changes, 85.4 per cent., have been obtained.

*Cautionary Signals.*—Out of 184 displayed along the Lakes and coast, 102 were succeeded by wind-velocities of over 24 miles per hour within a radius of 100 miles. So far as known, 82 were not justified. There have been reported 60 cases where the wind attained a velocity of over 24 miles per hour without the display of signals. All of these came from scattered stations, except on the 7th from the Western Gulf coast; 10th, New Jersey coast; 11th, New England coast; 21st and 22nd, Lakes.

## NAVIGATION.

Duluth, ice began to move out of harbor on 8th; first boat of season out 9th, and first arrived 13th; harbor closed by ice driven in by northeast gale 15th to 24th. Albany, canal navigation "officially" opened 4th. Buffalo, navigation opened 5th; harbor full of floating ice 11th, partly clear 12th, and clear 14th. Marquette, navigation opened 11th. Milwaukee, first steamer of season from Lower Lakes arrived 2nd; ice in straits of Mackinaw for 30 miles and unusually strong, some of it being four feet thick. Fort Niagara, N. Y., river free of ice 13th. Near Cape Rozier, (Gulf of St. Lawrence,) heavy ice fields seriously obstructed navigation 1st; four steamers and about sixty sails detained in the ice. Ice field 20 miles southeast of Anticosti Island 27th. St. Johns, Newfoundland, 10th, for the last fortnight, coast has been so beset with ice as to render it impossible for vessels to go to, or come from, the north, and with much difficulty can get south; harbor now full of field ice, and two large icebergs; 15th, ice outside; 18th, string of ice across harbor; 19th and 20th, ice in harbor.

*Height of Rivers.*—Upon chart No. III is printed a table giving the highest and lowest water-marks, with the dates upon which they occurred. The Red river fell nearly 3 feet from 1st to 6th, rose over 5 feet by 8th, and then fell steadily to close of month. The Mississippi was above the "danger line" at Cairo from the 10th to the 18th, continued above at Vicksburg throughout the month, and was very near it at New Orleans from the 7th to 10th.

## WATER TEMPERATURES.

The maximum and minimum temperatures alone, with the average depth of water, are given in a table on chart No. II, for stations along the lakes, rivers and coasts. The least range, 5°, was recorded at Duluth and Eastport; the greatest ranges, 26°, at Alpena, and 25° at Buffalo, Keokuk, Omaha and Yankton.

## ATMOSPHERIC ELECTRICITY.

*Auroras.*—That of the 25th was most extensively observed. Displays were reported as having been seen on the 4th and 11th at Monticello, Ia.; 12th, North Shippen, Pa.; 17th, Duluth and Florida, Mass.; 18th, Buffalo and Eastport; 23rd, Malone, N. Y.; 24th, Escanaba and Eastport; 25th, Duluth, St. Paul, Pembina, D. T., Alpena, Escanaba, Eastport, Gardiner, Me., and Malone, N. Y.

*Ground currents* were reported from Pikes Peak, 11th and 13th; Santa Fe, 25th; Milwaukee, 19th electric storm on telegraph line.

*Thunder-storms* have been very generally mentioned, whenever they have occurred, in giving the details under the head of low pressure-areas.

## OPTICAL PHENOMENA.

*Solar Halos.*—1st, Cal., Mich., Nev., Ohio, Utah, Wis., Va.; 2nd, N. Y., Penn., Conn., N. J., Mich., Neb.; 3rd, Ill., Iowa, Kan., N. Y., Ohio, W. Va.; 4th, Ill., Md., Mass., Mich., Del., Miss., N. Y., N. J., Wis.; 5th, N. Y., Fla.; 6th, Miss., N. Y., N. J., Minn.; 7th, Neb.; 8th, Ky., Ohio; 9th, Oregon; 11th, Mich., Ohio, Ill., Fla., N. Y.; 12th, Miss., Neb., Tenn.; 13th, Kan., D. T.; 14th, Mass., N. H., Mich., Conn., N. Y., Ohio, Penn., Tenn., Kan.; 15th, Ohio, Tenn., N. Y.; 16th, Mass., Miss., N. H., N. Y., Wis., S. C., Kan.; 17th, Iowa, Miss., Neb., N. Y., Ohio, Kan., Minn.; 18th, Mich., Miss., Ohio, Wis., S. C.; 19th, Miss., Neb., Tenn., Oregon; 20th, Ill., Iowa, Mich., N. H., N. Y., La.; 21st, Ga., Cal., Ill., Iowa, Me., N. Y., Oregon, Kan., Neb., Wash. Ter.; 22d, Iowa, Miss., Neb., N. Y., Oregon, W. Va., N. C., Wash. Ter.; 23rd, Ill., Ind., Iowa, Miss., Ga., Neb., Ohio, Tenn., Fla., Wash. Ter.; 24th, Ill., Ind., Ohio, Tenn., Me., Iowa, D. T.; 25th, Ind., Miss., Nev., N. J., Iowa, Fla.; 26th, Ill., N. Y., Wis.; 28th, Iowa; 29th, La., Iowa; 30th, Ind., 31st, Fla., Cal., Ill., Ind., Ga.

*Lamar halos*.—1st, Mich., N. Y., Ohio, Penn., W. Va., Va., Utah, Or.; 2nd, Me., Mich., N. Y., Col., R. I., Conn.; 3rd, Cal., D. T., Ga., Ill., Iowa, Kan., N. Y., N. C.; Ohio, Tenn., Va., W. Va., Penn., Me., R. I.; 4th, Fla., Cal., Iowa, Ga., La., Mass., Neb., N. J., N. Y., Ohio, Va., Penn., N. C.; 5th, N. C., Minn., Fla., Ga.; 6th, Ala., Miss., N. J., N. Y., Ohio, Va., Tenn., N. C.; 7th, N. J., Penn., S. C., Ill., Va., N. Y., N. C., Ga.; 8th, N. Y., Ill., N. C., Ga., Or.; 10th, Texas, N. C.; 11th, N. C.; 24th, Cal., Iowa; 25th, La., N. C.; 27th, N. C., La., Ga.; 28th, D. T., Ill., Mass., Iowa, Neb., La., Ohio, Miss.; 29th, Ala., Ill., N. J., Utah, Texas, R. I., Minn., N. C., D. T.; 30th, Ill., Tenn., Fla., Neb.; 31st, Ill., Ind., Tenn., Va., S. C., Fla., Neb., Minn., N. C.

*Mirage*.—10th, Ellinwood, Kan., and Evanston, Ill.; 17th, Duluth; 21st, Alpena; 2nd, 15th, 17th, 19th, 23rd, 24th, 28th, New London; 3rd, 4th, 10th, Tybee Island, Ga.

## MISCELLANEOUS PHENOMENA.

*Zoological—Birds*.—*Wild geese* were seen, flying N., at Duluth, and Hennepin, Ill., 10th; Northport, Mich., 2nd and 4th. *Martins* first seen at Breckinridge, 22nd; Eastport, 15th; Hennepin, Ill., 29th. *Swallows*, (barn and chimney,) appeared at Southington, Conn., 6th; Cornish, Me., 7th; Mt. Desert, Me., 17th; Dunbarton, N. H., 6th; Auburn, N. H., 1st; Waterburgh, N. Y., 12th; Palermo and N. Hammond, N. Y., 6th; Flushing, N. Y., 3rd; Coalville, Utah, 8th; Woodstock and Strafford, Vt., 8th; Utica, Wis., 9th; Breckinridge, 22nd; Eastport, 18th. *Oriole* appeared at Southington, Conn., 9th; Cornish, Me., 17th; Somerset, Mass., 7th; Dunbarton, N. H., 9th; Palermo, N. Y., 7th; Chambersburg, Pa., 3rd; Woodstock, Vt., 4th; West Charlotte, Vt., 9th; Strafford, Vt., 18th; Utica, Wis., 12th. *Sparrow* appeared at Eastport, 18th. *King bird* appeared at Southington, Conn., 10th; Cornish, Me., 9th; Somerset, Mass., 5th; Florida, Mass., 19th; Plattsmouth, Neb., 8th. *Plover* returned to West Charlotte, Vt., 7th. *Humming bird* appeared at Louisville, Ill., 9th; Auburn, N. H., 18th. *House wrens* appeared at Dunbarton, N. H., 9th; Palermo, N. Y., 8th; Eastport, 12th. *Bobolink* appeared at Louisville, Ill., 10th; Cornish, Me., 8th; Mt. Desert, Me., 16th; Somerset, Mass., 13th; Waterburgh, N. Y., 10th; Palermo, N. Y., 15th; North Hammond, N. Y., 7th; Woodstock and West Charlotte, Vt., 9th; Strafford, Vt., 15th. *Whip-poor-will* appeared at Holton, Kan., 10th; Cornish, Me., 12th; Oregon, Mo., 2nd; Auburn, N. H., 9th; Tioga Pa., 5th; North Shippen, Pa., 8th; Salem, W. Va., 3rd; Embarrass, Wis., 10th. *Robins* appeared at Mt. Desert, Me., 25th. *Blue-bird* appeared at Waterburgh, N. Y., 18th; Palermo, N. Y., 8th. *Cat-bird* appeared at Mt. Desert, Me., 25th; Somerset, Mass., 1st; Auburn, N. H., 12th. *Yellow-birds* appeared at Somerset, Mass., 3rd. *Brown thrush* appeared at Dunbarton, N. H., 9th; Auburn, N. H., 12th. *Mocking-bird* appeared at Northport, Mich., 18th; Embarrass, Wis., 7th. *Insects*.—*Colorado beetle* or *potato bug* about Rocky Run, Wis., 21st; Morgantown, W. Va., 8th; destroying potatoes and tomatoes at Stapleton, N. Y., and Trenton, N. J.; appeared at Southington, Conn., 28th. *Chintz bug* on wheat at Guttenberg, Ia. At Lynchburg, tobacco suffering from ravages of bugs. *Fire-flies* were seen at Benettsville, Ky., 3rd; St. Meinrad, Ind., and Stanley, Kan., 20th; Southington, Conn., 27th. *Winged ants* numerous at Benettsville, Ky., 7th. *Grasshoppers* hatched out at Breckenridge, 23d; were alive at Cheyenne, 14th; reported to have appeared in prairies near Pembina, and hatching out by millions in valleys about Virginia City, 28th. Young *Katydid*s crawling about at Brookhaven, Miss., 30th.

*Botanical*.—*String beans* ripe at Welborn, Fla., 1st. *Strawberries* ripe at Vineland, N. J., 30th. *Cucumbers* ripe at Welborn, Fla., 3rd. *Blackberries* ripe Welborn, Fla., 10th; Brookhaven, Miss., 20th. *Oleander* in bloom at Welborn, Fla., 15th. *Magnolias* in bloom at New Bedford, Mass., 2nd. *Jessamine* in bloom at Welborn, Fla., 17th. *Currants* bloomed at Riley, Ill., 6th; Fort Madison, Iowa, 11th. *Cherries* in bloom at Riley, Ill., 15th; West Waterville, Me., 22nd; New Bedford, Mass., 10th; Fall River, Mass., 6th; Westboro, Mass., 8th; Northport, Mich., 30th; Hudson, Mich., 6th; Auburn, N. H., 24th; Waterburgh, N. Y., 21st; Kensico, N. Y., 7th; Cleveland, 2nd; Egypt, Pa., 8th; Tioga, Pa., 18th; Utica, Wis., 20th; Cathlamet, Wash. Ter., during first week. *Apples* in bloom at Riley, Ill., 17th; Nora Springs, Ia., 12th; Cornish and West Waterville, Me., 30th; Williamstown, Mass., 23rd; New Bedford, Mass., 21st; Westboro, Mass., 20th; Fall River, Mass., 12th; Auburn, N. H., 24th; Palermo, N. Y., 27th; Nichols, N. Y., 20th; Kensico, N. Y., 20th; Starkey, N. Y., 28th; Urbana and Carthage, Ohio, 7th; Egypt, Pa., 9th; Tioga, Pa., 25th; Rocky Run, Wis., 21st; Neillsville, Wis., 24th; Cathlamet, Wash. Ter., during first week. *Quince Trees* in bloom at Vevay, Ind., 7th. *Plum Trees* in bloom at Independence, Iowa, 16th; Williamstown, Mass., 15th; Fall River, Mass., 2nd; Waterburgh, N. Y., 21st; Nichols and Starkey, N. Y., 14th; Tiffin, Ohio, 5th; Egypt, Pa., 7th; Tioga, Pa., 15th; Woodstock, Vt., 21st; Strafford, Vt., 27th; Rocky Run, Wisconsin, 21st; Cathlamet, Washington Ter., during first week. *Gooseberries* in bloom at Fort Madison, Iowa, 11th. *Pear trees* in bloom at Cornish, Me., 30th; Williamstown, Mass., 15th; New Bedford, Mass., 17th; Westboro, Mass., 13th; Fall River, Mass., 7th; Newark, N. J., 3rd; Waterburgh, N. Y., 21st; Palermo, N. Y., 26th; Nichols, N. Y., 18th; Starkey, N. Y., 14th; Tiffin, Ohio, 5th; Rocky Run, Wis., 21st; Cathlamet, Washington Territory, during first week. *Peach trees* in bloom at Williamstown, Mass., 9th; Fall River, Mass., 2nd and 3rd; Egypt, Pa., 5th; Hudson, Mich., 6th; Waterburgh, N. Y., 21st; Nichols, N. Y., 14th; Starkey, N. Y., 12th;